

This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the SectionFormat™ of the Construction Specifications Institute; the six digit section number cited is per CSI Masterformat™ 2004 and the five digit section number cited parenthetically is per CSI Masterformat™ 1995.

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SECTION 06 16 00 (SECTION 06160) – SHEATHING

SPECIFIER NOTE:

resource management Sheathing includes boards, wood structural panels, particleboard, chipboard, Medium Density Fiberboard (MDF) and hardboard. Alternative products such as cellulose fiber board (recycled newsprint), honeycomb cardboard (recycled paper or alternative agricultural fibers), and straw fiberboard (agricultural waste) are available and can serve many of the same purposes as MDF and particleboard; refer to Section 06 90 00 (06700) - Alternative Agricultural Products. Specify the sheathing product that is cost-effective to meet performance requirements. Each type of wood-based sheathing provides unique structural and serviceability properties. Wood structural panels, for example, are manufactured from veneers, or wood strands, or a combination of veneer and wood strands, bonded together with waterproof synthetic resins or other suitable bonding systems. Examples of wood structural panels are: composite panels, a structural panel that is made of layers of veneer and wood-based material; oriented strand board (OSB), a wood structural panel that is a mat-formed product composed of thin rectangular wood strands arranged in oriented layers; and plywood, a wood structural panel comprised of plies of wood veneer arranged in cross-aligned layers. Wood structural panels are used in applications, such as wall bracing and diaphragms because of their strength properties. MDF, which uses smaller waste wood particles than OSB is seldom used for structural applications because of its brittleness. Likewise, the use of particleboard, which uses the smallest wood particles, is restricted in the codes because of its brittleness..

toxicity/IEQ: Processed wood and wood waste products such as particleboard, chipboard, and hardboard often utilize formaldehyde-based resins as a binder or adhesive. Formaldehyde is considered a “probable” carcinogen based on animal data. ANSI standard A208.189 for particleboard limits formaldehyde emissions to 0.30 ppm for general purpose products and 0.20 ppm for flooring. Interior grade particle board is fabricated with urea-formaldehyde; exterior grade particle board is fabricated with phenol resin which is considered less toxic than urea formaldehyde. Particle boards that are formaldehyde free are also available. Alternative binders include: parafin wax (such as some cellulosic fiberboard), rosin, starch, and methyl diisocyanate (such as straw fiberboard or some MDF).

performance: Performance is comparable for green methods and standard methods. Since each product has unique structural and serviceability characteristics, performance is dependent on the design and application of the sheathing.

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Sheathing.
- B. Related Sections:
 - 1. 06 05 73 (06070) - Wood Treatment.

2. 06 10 00 (06100) – Rough Carpentry.
3. 06 20 00 (06200) – Finish Carpentry.
4. 06 90 00 (06700) – Alternative Agricultural Products.

1.2 SUBMITTALS

- A. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:

SPECIFIER NOTE:

Green building rating systems often include credit for materials of recycled content. USGBC-LEED™ v3, for example, includes credit for materials with recycled content, calculated on the basis of pre-consumer and post-consumer percentage content, and it includes credit for use of salvaged/recovered materials. Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

1. Recycled Content:

a. Engineered Wood Products:

- 1) Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
- 2) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- 3) If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- 4) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

SPECIFIER NOTE:

Salvaged lumber is lumber that had been previously utilized and has been salvaged for reuse. Salvaged lumber may also be referred to as 'reclaimed lumber.'

- b. Salvaged Lumber: Provide documentation certifying products are from salvaged lumber sources.

SPECIFIER NOTE:

Recovered lumber is lumber that had been previously harvested but which had been abandoned in transit to riverbeds or lakes.

- c. Recovered Lumber: Provide documentation certifying products are from recovered lumber sources.

SPECIFIER NOTE:

Specifying local materials may help minimize transportation impacts; however it may not have a significant impact on reducing the overall embodied energy of a building material because of efficiencies of scale in some modes of transportation.

Green building rating systems frequently include credit for local materials. Transportation impacts include: fossil fuel consumption, air pollution, and labor.

USGBC-LEED™ v3 includes credits for materials extracted/harvested and manufactured within a 500 mile radius from the project site. Green Globes US also provides points for materials that are locally manufactured.

2. Local/Regional Materials:

- a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.

- d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

SPECIFIER NOTE:

Green building rating systems may include credit for low emitting materials. USGBC-LEED™ v3, for example, includes credits for low-emitting materials, including: adhesives and sealants, paints and coatings, carpets, and composite wood and agrifiber products. Under LEED™ v3, adhesives and sealants are to comply with California's South Coast Air Quality Management District (SCAQMD) #1168; aerosol adhesives are to comply with Green Seal GS-36; interior architectural paints are to comply with Green Seal GS-11; anti-corrosive paints are to comply with Green Seal GS-03 (note – Green Seal has withdrawn GS-03; as of November 2008, anti-corrosive paints are included in a revised GS-11); clear wood finishes are to comply with SCAQMD #1113; carpet with the Carpet and Rug Institute (CRI) Green Label Plus; carpet cushion with CRI Green Label program; hard surface flooring with FloorScore; tile setting adhesives and grout with SCAQMD #1168; and, composite wood and agrifiber products are to contain no added urea-formaldehyde.

As per USGBC published Credit Interpretations, the credits for low-emitting materials are directed towards interior, site-installed (i.e. not prefabricated) products. Verify project requirements for low VOC roofing products.

Both the Adhesive and Sealant Council (ASC) and the SCAQMD have indicated that low VOC adhesives may have performance difficulties in extreme temperature and humidity conditions.

Green Seal, an independent, non-profit organization, certifies low-emitting products using internationally recognized methods and procedures. Green Seal certification meets the criteria of ISO 14020 and 14024, the environmental standards for ecolabeling set by the International Organization for Standardization (ISO); the U.S. Environmental Protection Agency's criteria for third-party certifiers of environmentally preferable products; and the criteria for bona fide ecolabeling bodies of the Global Ecolabeling Network.

Engineered wood products manufactured in accordance with ANSI standards are also available. For example, the Composite Panel Association's (CPA's) Standard for Particleboard, ANSI A208.1, includes maximum formaldehyde emissions for different grades of particleboard; ANSI A208.2, the Composite Panel Association's Standard for MDF, covers MDF for interior applications and includes maximum formaldehyde emission level for different grades of MDF.

3. VOC data:

a. Adhesives:

- 1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
- 2) Submit Green Seal Certification to GS-36 and description of the basis for certification.
- 3) **[Submit manufacturer's certification that products comply with SCAQMD #1168.] [Submit manufacturer's certification that products comply with SCAQMD Rule 1168 in areas where exposure to freeze/thaw conditions and direct exposure to moisture will not occur. In areas where freeze/thaw conditions do exist or direct exposure to moisture can occur, submit manufacturer's certification that products comply with Bay Area AQMD Reg. 8, Rule 51 for containers larger than 16 oz and with California Air Resources Board (CARB) for containers 16 oz or less.]**

b. Engineered Wood Products: Provide documentation that composite wood and agrifiber products **[are third-party certified as meeting ANSI standard requirements for formaldehyde emissions] [contain no added urea-formaldehyde resins.]**

- 1) ANSI A208.1 – 1999, Particleboard
- 2) ANSI A208.2 – 2002, Medium Density Fiberboard (MDF) for Interior Applications

SPECIFIER NOTE:

The Food, Conservation, and Energy Act of 2008 (also known as the 2008 U.S. Farm Bill) largely continues programs of the Farm Security and Rural Investment Act of 2002 ([2002 Farm Bill](http://www.usda.gov/farmbill/)) <http://www.usda.gov/farmbill/> Section 9002 requires each Federal Agency to develop a procurement program which will assure that items composed of biobased products will be purchased to the maximum extent practicable and which is consistent with applicable provisions of Federal procurement law. USDA designates biobased products for preferred Federal procurement and recommends biobased content levels for each designated product.

USGBC-LEED™ v3 includes credits for use of rapidly renewable materials, which USGBC describes as plants harvested within a ten-year cycle.

Green Globes – US, provides credit for integration of materials from renewable sources that have been selected based on life-cycle assessment.

4. Biobased materials:
 - a. Indicate type of biobased material in product.
 - b. Indicate the percentage of biobased content per unit of product.
 - c. Indicate relative dollar value of biobased content product to total dollar value of product included in project.

SPECIFIER NOTE:

Green building rating systems typically include credit for sustainably harvested wood. USGBC-LEED™ v3, for example, includes credit for use of sustainably harvested wood certified under Forest Stewardship Council Guidelines. Under LEED™ v3, a minimum of 50 percent of wood-based materials and products incorporated into the Project must be certified in accordance with the Forest Stewardship Council Guidelines.

Green Globes US also provides points for wood products that originate from certified sources, such as, Forest Stewardship Council, Sustainable Forestry Initiative, and the CSA Sustainable Forest Management Program.

- B. Letter of Certification(s) for Sustainable Forestry:
 1. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
 - a. Submit FSC certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the FSC certification numbers.
 2. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
 - a. Submit SFI certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the SFI certification numbers.
 3. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
 - a. Submit CSA certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the CSA certification numbers.

1.3 QUALITY ASSURANCE

- A. Sustainably Harvested Wood: Certification Organizations shall be accredited by the **[Forest Stewardship Council] [Sustainable Forestry Board] [Canadian Standards Association] [xxxxxxx]**.

- B. Recycled Content Materials: Where recycled lumber materials are used for structural applications, include lumber certification and quality grading.
- C. VOC emissions: Provide low VOC products.
 - 1. Adhesives and sealants: Comply with California's South Coast Air Quality Management District (SCAQMD) #1168
 - 2. Aerosol adhesives: Comply with Green Seal GS-36
 - 3. Engineered Wood Products: Provide products with no added urea formaldehyde.
 - a. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
 - b. Determine Volatile Organic Compounds (VOC), excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.

PART 2 - PRODUCTS

SPECIFIER NOTE:

EO 13423 includes requirements for Federal Agencies to use "sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products"

Specifically, under the Sustainable Building requirements per Guiding Principle #5 Reduce Environmental Impact of Materials, EO13423 directs Federal agencies to "use products meeting or exceeding EPA's recycled content recommendations" for EPA-designated products and for other products to "use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project."

Additionally, for USDA-designated biobased products, Federal agencies must use products meeting or exceeding USDA's biobased content recommendations; and for other products, biobased products made from rapidly renewable resources and certified sustainable wood products.

And, under the Sustainable Building requirements per Guiding Principle #4 Enhance Indoor Environmental Quality, EO13423 directs Federal agencies to use "materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings."

Executive Order 13514; *Federal Leadership in Environmental, Energy, and Economic Performance*; was signed on October 5, 2009. <http://www.ofee.gov/execorders.asp> It expands upon the environmental performance requirements of EO 13423.

http://www1.eere.energy.gov/femp/regulations/printable_versions/eo13423.html

EO 13514 sets numerous federal requirements in several areas, including sustainable buildings and communities. Federal agencies must implement high performance sustainable federal building design, construction, operation and management, maintenance, and deconstruction, including:

- Ensuring all new Federal buildings, entering the design phase in 2020 or later, are designed to achieve zero net energy by 2030.
- Ensuring all new construction, major renovations, or repair or alteration of Federal buildings comply with the Guiding Principles of Federal Leadership in High Performance and Sustainable Buildings <http://www1.eere.energy.gov/femp/pdfs/mouhighperfsustainfedfacs.pdf>
- Ensuring at least 15% of existing agency buildings and leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual progress towards 100% compliance across its building inventory.

2.1 SHEATHING MATERIALS

- A. Engineered Wood Products:
1. Toxicity/IEQ:
 - a. Products shall contain no added urea-formaldehyde.

SPECIFIER NOTE:

For current designations under the Federal Biobased Products Preferred Procurement Program (FB4P), refer to www.biobased.oce.usda.gov. As of January 4, 2010, the Federal Register includes designations for approximately 60 product types. The requirements for purchasing biobased items apply to those items directly purchased by the federal agency. Under a construction contract, the contractor's use of hydraulic fluid in its bulldozers and backhoes is incidental to the purpose of its contract, so the contractor is not required to use biobased hydraulic fluids. The Office of the Federal Environmental Executive (OFEE) recommends that agencies encourage the use of these items, however.

Currently designated items that affect construction include:

- Roof Coatings
- Water Tank Coatings
- Adhesive and Mastic Removers
- Composite Panels
- Fertilizers
- Plastic Insulating Foam
- Carpet and Upholstery Cleaners
- Carpets
- Dust Suppressants
- Packaging Films
- Glass Cleaners
- Hydraulic Fluids – Stationary Equipment
- Wood and Concrete Sealers
- Cleaners

The USDA currently has identified about 150 items for which it is collecting test data needed for the additional designations of items that will extend preferred procurement status to include all qualifying biobased products.

2. Biobased content:
 - a. Interior Panels: Engineered products designed specifically for interior applications and providing a surface that is impact-, scratch-, and wear-resistant and that does not absorb or retain moisture. Provide minimum 55% biobased content.
 - b. Structural Interior Panels: Engineered products designed for use in structural construction applications, including cabinetry, casework, paneling, and decorative panels. Provide minimum 89% biobased content.
 - c. Structural Wall Panels: Engineered products designed for use in structural walls, curtain walls, floors and flat roofs in commercial buildings. Provide minimum 94% biobased content.
- B. Plywood, APA: Provide exterior grade particleboard with phenol resin for interior and exterior applications.
- C. Oriented Strand Board: Phenolic-glued, low-formaldehyde board.

- D. Fiberboard:

SPECIFIER NOTE:

US-EPA Comprehensive Procurement Guidelines (CPG) recommends 80-100 percent recycled content for structural fiberboard and 100 percent post-consumer recycled content for laminated paperboard. Green building rating systems often include credit for materials of recycled content and may distinguish allowable credit for post-consumer and post-industrial (or pre-consumer) recycled content. USGBC-

LEED™ v3, for example, factors 100 percent of post-consumer recycled content but only 50 percent of pre-consumer (post-industrial) recycled content into calculations for its recycled content materials credit. LEED v3 grants one credit to a project for using materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10 percent of the total value of the materials in the project; 10% (post-consumer + 1/2 post-industrial). It grants an additional point for 20% (post-consumer + 1/2 post-industrial).

Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

Recycled content is typically determined by calculating the weight of the recycled material divided by the total weight of the product and expressed as a percentage by weight. (The recycled content “value” of a product as assessed under LEED is determined by multiplying the recycled content percentage and the cost of the product.)

Verify with manufacturer for product availability and recycled content.

1. Recycled content:
 - a. Structural: Minimum **[80] [xxxx]** percent recycled content.
 - b. Non-Structural: Minimum **[100] [xxxx]** percent post-consumer recycled content.

- E. Cellulose Honeycomb Panels: Panels shall be made of **[Kraft paper] [Fire Retardant paper] [and shall be impregnated with phenolic resins for moisture resistance]**.

SPECIFIER NOTE:

US-EPA Comprehensive Procurement Guidelines (CPG) recommends 100 percent post-consumer recycled content for laminated paperboard.

1. Recycled content: Minimum 100 percent post-consumer recycled content.

- F. Particleboard: Compressed wood fibers with phenol formaldehyde resin binder.

2.2 ACCESSORIES

- A. Adhesives: As specified in Section 06 10 00 (06100) – Rough Carpentry.
- B. Fasteners: As specified in Section 06 10 00 (06100) – Rough Carpentry.

PART 3 - EXECUTION

3.X SITE ENVIRONMENTAL PROCEDURES

- A. As specified in Divisions 01 (1) and Section 06 10 00 (06100) – Rough Carpentry.

END OF SECTION